

Table 2. Summary Screening of Remedial Technologies and Process Options by AOPC for the Portland Harbor Superfund Site.

General Response Action	Remedial Technology	Process Options	Description	Screening Comments ¹
No Action	None	Not Applicable	No Action	Required for consideration by NCP
Institutional Controls	Governmental Controls	Fishing Bans	Commercial fishing bans are government controls that ban commercial fishing for specific species or sizes of fish or shellfish and are established by state departments of health or other governmental entities.	Retained for all AOPCs. ²
		Waterway Use Restrictions or Regulated Navigation Areas	Provides notice to navigation to prevent damage to caps, in-situ treatment, EMNR, etc.	Retained for all AOPCs. ²
	Proprietary Controls	Deed restrictions, easements, and covenants	Restrictions placed in property related documents.	Retained for all AOPCs. ²
	Enforcement and Permit Tools	Permit Processes or Provisions of Administrative Orders or Consent Decrees	Restrictions implemented through agencies who permit construction activities in the aquatic environment or placed by EPA on the potentially responsible party through orders or consent decrees.	Retained for all AOPCs. ²
	Informational devices	Fish Consumption Advisories	Fish consumption advisories provide information to the public from state departments of health or other governmental entities on acceptable fish consumption rates and fish preparation techniques.	Retained for all AOPCs. ²
Natural Attenuation	Monitored Natural Recovery	Monitored Natural Recovery	Monitored Natural Recovery through physical (e.g., burial), chemical (e.g., photolysis) and biological (e.g., biological degradation) processes.	Retained for all AOPCs.
		Enhanced Monitored Natural Recovery (EMNR)/Thin Layer Placement	Enhancement of MNR (e.g., burial) through placement of a thin layer of material (e.g., 6" of sand).	Retained for all AOPCs.
Containment in Place	Capping	Engineered Cap	Physical isolation of contaminants with sand cover and other structural elements (such as armor) as necessary to keep the cap stable.	Retained for all AOPCs.

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In-Situ Treatment		Active Capping (Engineered Cap with Active Layer)	Physical isolation of contaminants with engineered cap; active layer to reduce contaminant flux.	Retained for all AOPCs.
		Engineered or Active Caps with Habitat Layers	Physical isolation of contaminants with engineered cap; habitat layer at surface to enhance reestablishment of benthic community and/or provide mitigation for remedy impacts.	Retained for all AOPCs.
	Biological/Chemical	Enhanced Bioremediation	Addition of nutrients and other amendments to enhance bioremediation	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Phytoremediation	Use of plants to remediate contaminated sediments	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Chemical Oxidation	Application of chemical oxidants to remediate contaminated sediments	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
	Contaminant Sequestration	In-Situ Solidification/Stabilization	The addition of reagents that immobilize and/or bind contaminants to the sediment in a solid matrix or chemically stable form.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		In-Situ Vitrification	Use of strong electrical current to heat sediment to temperatures above 2400°F to fuse it into a glassy solid.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Electrochemical Remediation	Technology for degrade organic contaminants in situ by applying an alternating current across electrodes placed in the subsurface to create redox reactions.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Direct Amendment	Carbon (activated carbon or other carbon materials) to reduce bioavailability of organic contaminants, other amendments to treat a wider range of COCs.	Retained for all AOPCs.

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		Enhanced Cap Materials	Placement of active capping layers such as activated carbon or organoclay to reduce contaminant flux through capping materials. Same technology as described above for "Active Capping".	Retained for all AOPCs.
Removal	Dredging	Mechanical Dredging, Water Based	Use of clamshell, closed, hydraulic, or other buckets to remove contaminated sediment from a barge or other vessels.	Retained for all AOPCs.
		Mechanical Dredging, Land Based	Use of excavators, buckets, etc. deployed from land based equipment. Can be "in the wet" or "in the dry" in combination with sheet piles, coffer dams, or other measures to remove water.	Retained for all AOPCs.
		Hydraulic Dredging	Use of hydraulic dredges with various cutter and suction heads to remove contaminated sediments. Requires extensive dewatering facilities.	Retained for all AOPCs.
		Small Scale Dredge Equipment	Diver assisted hydraulic dredging, Mud Cat, and similar small scale removal methods.	Retained for all AOPCs.
Ex-Situ Treatment	Pre-Treatment	In-barge Dewatering	Dewatering through passive dewatering on barge	Retained for all AOPCs. ³
		Lagoon Dewatering	Dewatering through placement in lagoon. Water discharge takes place on particles have settled out.	Retained for all AOPCs. ³
		Geotextile Tube Dewatering	Geotextile tubes allow water to migrate through membrane retaining sediments	Retained for all AOPCs. ³
		Mechanical Dewatering	Use of filter presses or other similar equipment	Retained for all AOPCs. ³
		Reagent Dewatering	Use of reagents to chemically absorb excess water.	Retained for all AOPCs. ³
	Biological Methods	Land Treatment	Large scale land treatment to reduce contaminant concentrations through biological processes.	Retained for select AOPCs.

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		Composting	Large scale land treatment to reduce contaminant concentrations through composting.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Biopiles	Large scale land treatment to reduce contaminant concentrations through biopiles	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Slurry-phase Treatment	Biological treatment in a slurry phase.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
	Physical/Chemical	Particle Separation	Separation of sandier sediments with less contamination for beneficial reuse.	Screened out for all AOPCs.
		Blending	Blending of contaminated sediment with other material for beneficial reuse.	Screened out for all AOPCs.
		Cement Solidification/Stabilization	Solidification/stabilization of contaminated sediments through addition of Portland cement.	Retained for select AOPCs.
		Sorbent Clay Solidification/Stabilization	Solidification/stabilization of contaminated sediments through addition of sorbent clays such as bentonite.	Retained for select AOPCs.
		Asphalt Emulsion	Treatment of contaminated sediments with asphalt emulsion to remove water and bind contaminants.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Sediment Washing	Wash sediments with water to remove contaminants.	Screened out for all AOPCs.
		Chemical Extraction	Use chemical extractant to remove contaminants from sediment.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Chemical Oxidation/Reduction	Degradation of contaminants through redox or slurry oxidation.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Dehalogenation	Removal of halogens (e.g., chlorine) through chemical dehalogenation reactions.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³

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	Thermal Methods	Incineration	Thermal treatment through incineration.	Screened out for all AOPCs.
		Pyrolysis	Thermal treatment through pyrolysis.	Screened out for all AOPCs due to likely limited effectiveness and implementability issues. ³
		Thermal Desorption	Heating of contaminated sediment to drive off and capture contaminants.	Screened out for all AOPCs.
		Vitrification	Application of electrical current to heat contaminated sediments to high temperatures.	Screened out for all AOPCs.

1 Rationale for screening decision provided in the Alternatives Screening Presentation dated April 6, 2011 unless otherwise noted.

2 Rationale for screening decision provided in materials on Institutional Controls supplemental to the Alternatives Screening Presentation dated April 6, 2011.

3 Rationale for screening decision provided in the Treatment Technology Evaluation Tools Memorandum dated March 15, 2011 or previous documents cited there.